Amendments to the Specification

Please amend the Cross-Reference to a Related Application on page 1 line 8 of the specification as follows:

Cross-Reference to a Related Application

A1 This is a continuation-in-part of co-pending application Serial No. PCT/US98/16957 filed August 14, 1998, which is a continuation-in-part of co-pending application Serial No. 08/912,485 filed August 18, 1997, now U.S. Patent 6,048,374.

Please substitute the following paragraph at page 11, from line 1 to line 10:

Referring to Figure 3, in a preferred embodiment, the outlet **50** at the bottom of the reactor tube [**15**] 2 is shaped such that the CAT forms a plug **16** capable of withstanding differential pressures up to about 100 psi or more. This plug **16** insures that the product gas goes toward the inner hopper **10** and the combustion gases go out, for example, the combustor exhaust **14**. In a specific embodiment, the combustion exhaust can proceed through opening **43** in a flame guard A2 plenum **42**, where the exhaust can heat the funnel wall **44** carrying feedstock to the auger-reactor. This can begin the process of raising the feedstock to high temperatures and, in addition, extract heat from the combustion exhaust gases. Further extraction of the heat of the combustion exhaust gases can be accomplished by heating the incoming air **51**, **52** using a heat exchanger.

Please substitute the following paragraph at page 11, from line 11 to line 17:

At outlet **50** of orifice **17**, an additional plugging means, for example an adjustable or spring loaded cone-like plug **18**, can be used to plug orifice **17**, for example at start up, and can be opened by the extrusion pressure when an adequate CAT plug **16** is formed. The plug **18** can also prevent output gases from leaking into the combustion chamber **6** and prevent combustion gases from A3 leaking up into the reactor tube. This plug **18** can, for example, be operated by or maintained by spring loading **23** (see Figure 4). In these ways the outlet **50** can be adjustable, to optimize the CAT extrusion to serve as a plug for any feedstock.

Please substitute the following paragraph at page 11, from line 18 to line 25:

As the CAT plug **16** is extruded out of outlet **50**, the char falls onto, for example, grate **7**. Blower **9** can blow heated air, into the combustion chamber **6** to provide over-fire tangential or incoming air **51** for combustion of the char, and under grate **7** to provide under-fire air **52** for combustion of the char. In a specific embodiment, the exhaust gases from **14** can be used with a simple heat exchanger to preheat the air entering the combustion chamber. Once the char is burned, the ashes can fall through grate **7** and spider **19** into ash receptacle **11**. A start-up gas burner **20** (e.g., propane) can be utilized for initial heating of the reactor tube and can be located, for example, integrally with spider **19**.

Please substitute the following paragraph at page 11, line 26:

In a specific embodiment, a burning means, for example comprised of pipes **53** and valves **32**, can be used for burning some of the product gas through burner **55** (see Figures 4, 5) in the combustion chamber **6** to provide heat for gasification. In addition, an external source of gaseous fuel can be provided through input **31** for the combustion chamber when, for example, the feedstock has insufficient heating value, the feedstock is wet, or when the char ash is to be collected because of toxic content.

Please substitute the following paragraph at page 12, line 3:

In an alternate embodiment, as shown in Figure 5, grate **7** is replaced by a solid plate so that chamber **11** becomes a simple pressure vessel char-ash collector. In this embodiment, upon entering the high temperature zone the feedstock, in the absence of oxygen, begins to pyrolyze, forming gases, liquids (tars), and a solid residue (char/ash). As the feedstock reacts, the solid extrudes out the bottom into the char collector or chamber **11**. The gases and vapors that are generated flow upwards, through the reactor and the incoming feedstock in the hopper, where some of the condensable gases (tars) are removed and some pass through, depending upon the feedstock height in the hopper. The output of the gasifier is passed into separator **27** that can perform various functions depending upon the mode of operation of the microgasifier. In the gas production mode the separator primarily

separates particles from the gas stream that have not already been filtered out by the incoming feedstock. In this mode molecular sieves can be used to separate molecular hydrogen from the remaining gases which can exit through orifice **29** into a compressor for storage and premium fuel use. These molecular sieves may be, for example, zeolite or ceramic.

Please substitute the following paragraph at page 15, line 29:

The basic microgasifier of the subject invention can be adapted to produce, for example, oil and/or liquids. Referring to Figure 3, an inner tube **21** can be provided, for example, with apertures **54** that can be opened or closed, for example by rotating inner tube **21** up to or through 90, to provide paths for the pyrolysis and gasification gases to go directly out of the auger reactor region to the top of the inner hopper **10**. These gases can exit the inner tube through aperture **26** and subsequently through output gas opening **13**. An external demister and water cooled condenser can be provided in the separator **27** to cool the condensable gases in order to extract oils and/or liquids. The non-condensable gases can be burned in the combustion chamber through outlet **28** and valve **32** with burner **55** (see Figures 4, 5). Alternatively, through high temperature plumbing **56**, part of these non-condensable gases can be pumped through the inner tube to speed the transport of the condensable gases to the condenser separator **27**. Additionally, a means for adjusting excess air and tangential swirl can be used in the combustion chamber in order to lower the temperature in the combustion chamber and, therefore, lower the temperature acting on the reactor tube. In a specific embodiment, further reduction of the temperature acting on the reactor tube can be accomplished by deflecting the flame zone from the tube. The feed rate can also be increased so that the average temperature experienced by the feedstock before escaping as gases through apertures **54** is lowered.

Please substitute the following paragraph at page 16, line 18:

The basic microgasifier of the subject invention may also be modified or adapted in order to gasify feedstock with toxic contents. An anaerobic (without air) gasifier can lower the formation of volatile metal oxides or otherwise lower the volatilization of metallic constituents in favor of deposition in the char-ash residue. Referring to Figure 4, an embodiment in accordance with the subject invention which can be used to gasify feedstock with toxic contents is shown. The

gasification reactor is anaerobic, which can lower the formation of volatile metallic oxides or otherwise promote metallic deposition in the char-ash. For example, in the embodiment shown in Figure 4, the change from Figure 3 is the replacement of the male cone or adjustable or spring loaded cone-like plug **18** by a female hollow tube **49** that extrudes char-ash, for example, through the diagonal orifices at its bottom. The openings of the ring burner-spider **19** are covered to avoid burning the char-ash ladened with toxics. Advantageously, this facilitates the adaption of the gasifier for the disposal of discarded copper chromium arsenate (CCA) treated wood and subsequent reconcentration of the CCA, and/or its constituents. This embodiment can also be useful for the disposal of plant matter used in phytoremediation to capture toxic metals from contaminated sites. The char-ash-tar outlet is modified to feed into a collector for later processing.

A8

Please substitute the following paragraph at page 17, line 9:

A means for inputting external solid feed (e.g., coal and/or tire chips) to provide heat of gasification or to enrich the feedstock can also be added to the outer hopper. In addition, an external hopper **15** (see Figure 1) and system for feeding stored fuel (e.g., coal, tire chips, RDF, heavy oil) directly to the combustion grate can be provided. The feeding of stored fuel directly to the combustion grate can provide gasification energy when, for example, the char-ash is ladened with toxics and, therefore, not burned. In addition, the feeding of solid fuels directly to the combustion grate can be useful when the normal feedstock is wet and/or when external gas supplies are limited. Feeding biomass to the gasifier via the outer hopper **8** (see Figure 1) and coal to the combustion via this external hopper can also have operational advantages when biomass feedstock must be stretched.

A9